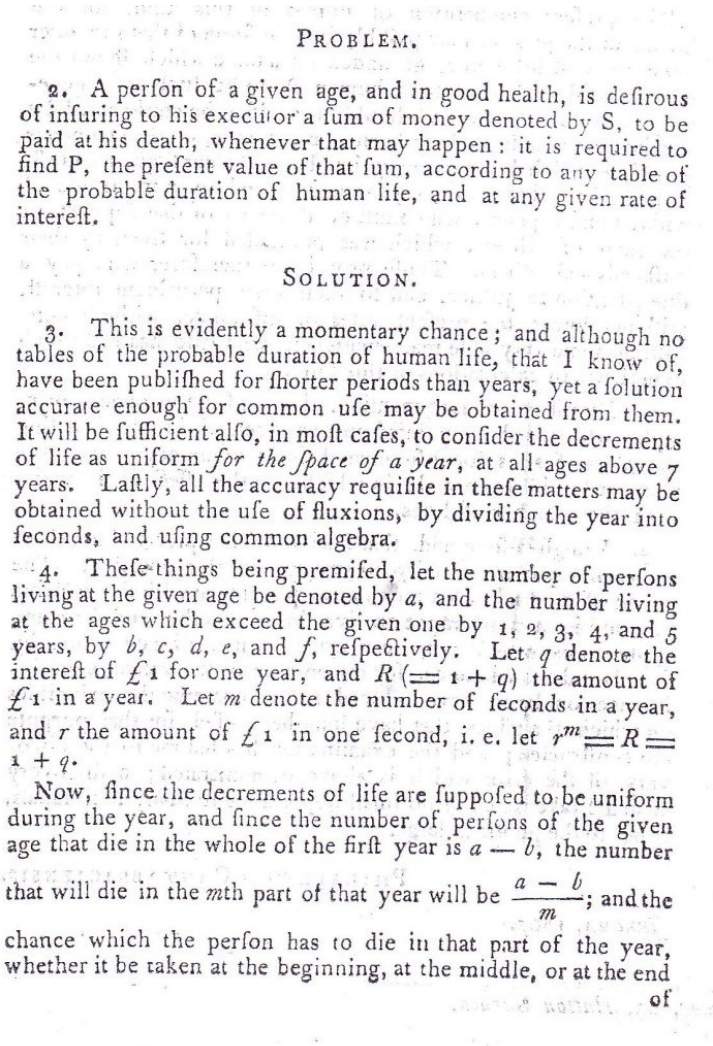
A 'good, average man'

A 'good, average man': calculation and the limits of statistics in enrolling insurance customers

Abstract Drawing upon the historical relationship between statistics, probabilistic reasoning and life insurance, the article argues that mathematical calculation played a necessary but limited role in making markets for life insurance. Insuring publics have been fairly consistently cautious in the use of probabilistic and statistical reasoning to inform investment in life insurance. In this they follow a pattern set by early insurance companies who themselves were slow to alter their commercial practices in line with emerging knowledge. I examine some of the reasons for this glacial pace and some of the ambiguities on which statistical 'certainties' were built as part of an argument that the role of statistics and mathematics in market calculation is both less and more than it seems. This is manifest in the history of industrial life assurance, an industry with a phenomenally successful track record in the mass enrolment of consumers. Unlike their predecessors, industrial companies disdained swamping their target markets with probabilistic arguments in favour of a very different sort of argument that, nevertheless, carried a trace of statistical thinking with it. This trace came in the form of 'good, average men', the agents who became industrial insurance's core marketing device and who translated the essentials of a statistically informed product into a more palatable, more calculable form.

Figure 1 'A new solution of a problem in insurance of money on lives' 1807, (JJ)



PROBLEM.

2. A perſon of a given age, and in good health, is deſirous of inſuring to his executor a ſum of money denoted by S, to be paid at his death, whenever that may happen: it is required to find P, the preſent value of that ſum, according to any table of the probable duration of human life, and at any given rate of intereſt.

SOLUTION.

3. This is evidently a momentary chance; and although no tables of the probable duration of human life, that I know of, have been publiſhed for ſhorter periods than years, yet a ſolution accurate enough for common uſe may be obtained from them. It will be ſufficient alſo, in moſt caſes, to conſider the decrements of life as uniform *for the ſpace of a year*, at all ages above 7 years. Laſtly, all the accuracy requiſite in theſe matters may be obtained without the uſe of fluxions, by dividing the year into ſeconds, and uſing common algebra.

4. Theſe things being premiſed, let the number of perſons living at the given age be denoted by a, and the number living at the ages which exceed the given one by 1, 2, 3, 4, and 5 years, by b, c, d, e, and f, reſpectively. Let q denote the intereſt of £1 for one year, and $R\ (=1+q)$ the amount of £1 in a year. Let m denote the number of ſeconds in a year, and r the amount of £1 in one ſecond, i. e. let $r^m = R = 1+q$.

Now, ſince the decrements of life are ſuppoſed to be uniform during the year, and ſince the number of perſons of the given age that die in the whole of the firſt year is $a - b$, the number that will die in the mth part of that year will be $\frac{a-b}{m}$; and the chance which the perſon has to die in that part of the year, whether it be taken at the beginning, at the middle, or at the end of

of it, will be expreſſed by $\frac{a-b}{am}$*. The number of theſe equal chances in the whole year is evidently $= m$; and the preſent value of the ſum S, to be received on all theſe chances, is the ſum of the ſeries $\frac{a-b}{amr}S + \frac{a-b}{amr^2}S + \frac{a-b}{amr^3}S$, &c. continued to m terms, $= \frac{a-b}{am}S \times \left(\frac{1}{r} + \frac{1}{r^2} + \frac{1}{r^3}\text{ &c. to }\frac{1}{r^m}\right)$ $= \frac{a-b}{am}S \times \left(\frac{1}{r-1} - \frac{1}{r^m \times (r-1)}\right)$; which expreſſion, by writing R for its equal, r^m, and reducing the fractions to a common denominator, becomes $\frac{a-b}{am}S \times \frac{R-1}{R(r-1)} = \frac{a-b}{aR}S \times \frac{R-1}{m(r-1)}$.

5. Again, ſince the number of perſons that die in the ſecond year is $b - c$, the chance of one perſon's dying during that whole year is $\frac{b-c}{a}$, and of his dying in any mth part of it will be denoted by $\frac{b-c}{am}$; and the preſent value of receiving the ſum S on m ſuch chances will be $= \frac{b-c}{amRr}S + \frac{b-c}{amRr^2}S + \frac{b-c}{amRr^3}S$, &c. to m terms, the ſum of which (by the preceding art.) is $= \frac{b-c}{amR}S \times \frac{R-1}{R(r-1)} = \frac{b-c}{aR^2}S \times \frac{R-1}{m(r-1)}$.

In like manner, the preſent value of all the chances of receiving the ſum S, during the third, fourth, and fifth years, will be found to be $\frac{c-d}{aR^3}S \times \frac{R-1}{m(r-1)}$, $\frac{d-e}{aR^4}S \times \frac{R-1}{m(r-1)}$, and $\frac{e-f}{aR^5}S \times \frac{R-1}{m(r-1)}$, reſpectively. The law of continuation to the end of the table of probable duration of human life is very evident. The terms of the ſeries which thus ariſes are as follows:

For the 1ſt. year $\frac{a-b}{aR}S \times \frac{R-1}{m(r-1)}$,

2d. .... $\frac{b-c}{aR^2}S \times \frac{R-1}{m(r-1)}$,

3d. .... $\frac{c-d}{aR^3}S \times \frac{R-1}{m(r-1)}$,

4th. .... $\frac{d-e}{aR^4}S \times \frac{R-1}{m(r-1)}$,

5th. .... $\frac{e-f}{aR^5}S \times \frac{R-1}{m(r-1)}$, &c. &c. to the end

* This may be illuſtrated, for the ſatisfaction of thoſe who are not well acquainted with the doctrine of chances, as follows: According to Dr. Halley's obſervations, out of 427 perſons living at the age of 42 years, 10 die in the ſpace of 1 year. Therefore, by the hypotheſis, 1 will die in the 10 part of a year; and the chance which a perſon of the aforeſaid age has to live the firſt 10th part of a year is expreſſed by the fraction $\frac{419}{427}$, certainty being denoted by 1; and the chance which he has to die in the firſt 10th part of the year is expreſſed by the fraction $\frac{1}{427}$. Again, ſince

The above is an extract from an 1807 publication 'A new solution of a problem in insurance of money on lives' by the presumably pseudonymous author 'Philalethes Cantabrigiensis' (JJ). The solution requires another three stages of argument to demonstrate what 'will appear

to any competent judge of these matters' *viz* that the calculations of the most celebrated writers on this branch of mathematics 'are grounded on an erroneous principle'. That principle involves taking the value of chance in the first 1/10 of the year as equivalent to its value in the last 1/10 of the year. It is not part of my ambition to establish whether or not Cantabrigensis' confessed excitement at his discovery was justified. Rather my aim is to show that mathematical argument, whether competent or incompetent, could never be sufficient by itself to foster life assurance markets.

As tricky as early nineteenth century arguments that commercial risk practices should be more closely aligned with the emerging principles of probability and statistics undoubtedly were; the concrete problem of enrolling people as consumers of life assurance was trickier still. To make matters more perplexing, probability and statistics were put to work by insurance companies in an attempt to solve the latter problem well in advance of their effective use for the commercial calculation of risk. In short, while insurance companies were loudly extolling the scientific 'certainties' on which their business was based, by a range of measures these 'certainties' were anything but. As Augustus De Morgan's 1837 review of Laplace's *Théorie Analytique des Probabilités* observes, there were very few people competent to judge either Laplace's methods or his results and even fewer able to judge both.

> It might appear to be our intention to decry the work which we have placed at the head of this article. Now, even meaning by the world the mathematical world, there is not a sufficient proportion of that little public which has read the work in question, to raise any such collective sound as a cry either on one side or the other. […] The pure theorist has no immediate occasion for the results, as results, and therefore contents himself in many instances with a glance at the processes, ... The practical observer and experimenter obtains a knowledge of results and nothing more, will [*sic*] knowing in most cases, that the analysis is above his reach. We could number upon the finders [*sic*] of one hand, all the men we know *in Europe* who have *used* the results in their *published* writings in a manner which makes it clear that they could both *use* and *demonstrate*. (1837, p9, *my insertion*)

The scarcity of people who could both use and demonstrate probability theory and statistical reasoning and results, whether or not in relation to insurance, I suggest, was not just a freak of the pioneer period. Over time, this reluctance or inability to use probabilistic and statistical reasoning to inform an understanding of life insurance has some claim to continuity as a characteristic of the insuring public. In this article I explore the relationship between knowledges of probability and statistics and the commercial practices adopted by life insurance companies particularly those specialising in industrial insurance. The industrial offices are interesting because they represent a phenomenally successful mass enrolment of consumers in a part of the business which, by the end of the nineteenth century, was indeed grounded in probabilistic and statistical calculation, yet made little of it in its marketing. Industrial companies disdained swamping their target markets with probabilistic arguments in favour of a different sort of argument, which, nevertheless, carried an idea, a faint trace, of statistical thinking with it. This trace came in the form of 'good, average men', the collecting agents who became not only a marketing device but an effective means of market framing by which the essentials of a statistically informed product were translated into a more palatable, even a more *calculable* form.

The article begins with an overview of the historical relationship between insurance, statistics and probability to establish its extent but also its limits. It then goes one to review the trouble with probability and statistics both methodologically and in relation to the marketing challenge posed by life assurance. This is followed by a discussion of how agents as extraordinarily successful, systematically cultivated, devices for the enrolment of consumers addressed the marketing challenge. The significance of agents' achievement should not be understated. The history of industrial life assurance contains an object lesson in mass consumer enrolment in what, by many measures, was an off-putting, complicated and expensive product, but one which nonetheless easily outclassed a series of state sponsored

alternatives. Fundamentally, industrial insurance flourished because its proponents understood that even the most technical, most quantitative financial product, had also to engage the passions.

Insurance, statistics and probability

> 'And so the poor gentleman's dead sir! Ah! The more's the pity.' … 'But it's what we all must come to. It's as certain as being born, except we can't make our calculations as exact.' (Mrs Gamp in *Martin Chuzzlewit,* Dickens, 1994, p306)

Nineteenth century commercial insurance, as has been ably demonstrated elsewhere, had some part in promoting the idea that large numbers would behave in accordance with discoverable laws, that chance could be 'tamed' (Hacking, 1990, Porter, 1996). Commercial insurance may have acted, as Gigerenzer et al. (1989) note, as the first practical and market test of statistical and probabilistic models, but this does not mean that the relationship between them was ever straightforward. As neat as the fit may appear, it is certainly not the case that commercial insurance, grew, in any simple sense, out of the developing knowledges of statistics and probability.

There are a number of reasons for this but perhaps the most interesting relates to the peculiar history of insurance. The fact that commercial insurance practices came into closer alignment with statistical and probabilistic modelling as the nineteenth century progressed is only one, albeit significant, dimension of this history. Ewald's (1991) definition of insurance as a technology that compensates for the effects of chance through the mechanism of mutuality organised according to the laws of large numbers may capture the essentials but it also skates over the strange and varied ways insurance has been made to work. Insurance may be a technical method of risk spreading, it may be more or less efficient depending on the technical and methodological arrangements employed, but it is also more than this. As far as

its publics, its consumers are concerned; insurance is a promise –one that strikes at the heart of making the world liveable. As the American poet and insurance underwriter Wallace Stevens put it.

> The significance of a business is not wholly an affair of its statistics. … The objective of all of us is to live in a world where nothing unpleasant can happen. Our prime instinct is to go on indefinitely like the wax flowers on the mantelpiece. Insurance is the most easily understood geometry for calculating how to bring the thing about. (in Wertheimer, 2006, xi)

Discussing Stevens, Wertheimer argues that to everyday policyholders, insurance promises a world of irreversible value, where nothing need ever be lost, a fantasy of a replaceable totality. The promise doesn't bear much scrutiny of course. The effects of death, accidents, even theft, are not recoverable - no matter how comprehensive, how 'like-for like' the cover, something remains lost. In promising what it can't entirely deliver insurance stands in a peculiar relationship to the inevitability of loss and change. Charles Sanders Peirce doomily notes that according to the doctrine of chances, the time must come when an insurance company's losses will bring it to a stop in the same way 'as every good fortune, as every human dynasty, as every human civilisation' (1998, p 72) eventually breaks down.

Insurance, historically, is imagined as a response to loss and change, to fortune and accident, life and death. This lends insurance a stubborn taint of the metaphysical even while it works to distribute and price risk. Perhaps unique among mass-marketed consumer goods, insurance derives from ties of love, fear and security in peculiar combination with the relations of chance, risk and logic. But a foundation in chance, risk and logic is not the same as a foundation in statistics and probabilistic reasoning. While many writers have emphasized the far-reaching significance of the introduction of statistically informed insurance techniques in the first half of the nineteenth century, insurance had by then, as Gigerenzer et al. (1989)

and Clark (1999) document, been carrying on a lively trade with little reference to such techniques for well over a century.

Intriguingly, it was not ignorance of mortality statistics that left early offices to ply their trade as best they could without them. Halley's table setting out the average continuance of life at different ages had first appeared in 1693, mortality bills were thereafter widely disseminated in publications like the *Gentleman's Magazine* and there was a determined move amongst probabilists to rationalise commercial risk taking (Clark, 1999; Gigerenzer et al., 1989). Yet it was another 70 years before the Equitable became the first company to use mortality tables to inform the introduction of graduated policy premiums, while older companies, notably London Assurance and the Royal Exchange, resisted for a further few decades. Clark accounts for this long hiatus contextually.

> Early life assurance promoters and their customers fully appreciated the significance of the mortality statistics derived by the political arithmeticians and made reasonable and limited use of them. The findings of the new demography did not in fact fall on deaf ears, partly because they did not possess the immediate and overwhelming persuasiveness that many historians have attributed to statistical knowledge. Instead, a statistical approach… competed with entrenched, and often credible, popular beliefs about mortality patterns – beliefs to which even the probabilists and statisticians themselves sometimes subscribed. (1999, p.118)

In the early eighteenth century, statistics were a means of knowing but it was by no means clear that they were a superior means. Given the limits of the available mortality statistics and the specific risks of insuring the volatile urban population of eighteenth century London, companies developed alternate technical means of managing their risks by limiting the insured population and diversifying their investments (Clark, 1999). That eighteenth century insurance was 'done' largely without the available statistics does not mean it was done in wilful ignorance of an obvious improvement. As Desrosieres (1998), Gigerenzer et al. (1989) and Porter (1996) have painstakingly explained the easy trust in numbers, statistics and

probabilistic reasoning characteristic of the last 150 years or so, was not a foregone conclusion but the result of a process. This is the case partly because competent judges of emerging modes of reasoning are always few and those that exist often differ. Trust in numbers also required a much broader set of changes in the practices of science and experimentation away from the private and mysterious patterns of the seventeenth century to the more public, institutionalised and open arrangements which prevailed in the nineteenth century. That experimental scientific results, witnessed and understood by very few, came to be accepted as accurate or true by many, in Porter's (1996, p.15) account was a 'triumph of rhetoric', an outcome, in part, of the increasing refinement of 'technologies of trust'. After a slow start, the insurance industry by the mid-nineteenth century was a keen but, unsurprisingly, *interested,* participant in this exercise.

By 1809 when Cantabrigensis published his solution, London Assurance had introduced graduated premiums based on age at entry and the industry had accumulated some experience in using mortality statistics to price premiums. This might have been expected to produce a substantial boost to the market. The use of more accurate mortality statistics was ultimately to reduce premium prices, and reveal the solvency of companies like the Equitable to have been based partly on overpricing (cf. de Morgan, 1837, Alborn, 2002). This in turn helped bring life insurance within the reach of a much larger market among the middle classes. But the shift from the peculiar mix of speculation and prudence that had characterised the industry in the eighteenth century to the actuarially enhanced nineteenth century form took some time to achieve. In 1805 there were only 5 companies, all London based, offering life insurance and only a further 15 by 1820; the big boom waited until the 1830s with as many as 50 new companies springing up each decade between then and the 1870s (Alborn, 2009). This growth marked a period of trouble as well as one of expansion. The majority of these newly formed companies were fuelled by stock market speculation and proved very temporary concerns.

Others were the sort of rotten or incompetent enterprises exemplified by the Great Middlesex's notorious swindle of 1836, itself the likely inspiration for Dicken's spectacularly corrupt Anglo-Bengalee Disinterested Loan and Life Assurance Company in *Martin Chuzzlewit*.

This pattern of rapid expansion and equally rapid failure was symptomatic of the unsettled state of the industry and its still unresolved relationship with actuarialism. By indicators such as new start-ups, technical innovations and potential market growth the industry was burgeoning but growth amongst the middle and lower middle classes was slower than predicted and slower than those reformers and advocates who saw life assurance as a means to social improvement had hoped. As De Morgan's (1838, p5) essay put it despite its growth, the capital invested in insurance was 'trifling compared with what will be the case when its principles are better understood'. This slow pace of growth is not that surprising given that insurance companies were trying to promote a product that was not only technically demanding but emotionally laden and, at least in some contexts, morally and ethically challenging (McFall, 2007). Added to this was the burden of trying to maintain the reputation of an industry against a series of notorious scandals, frauds and failures. Probability, statistics and actuarial science in this context were seized upon as much as a rhetorical as a technical solution. What interested insurance companies, was not simply what emerging techniques could actually do, but what they could be claimed to do.

By the middle of the century references to the certainties offered by a new understanding of the effect of statistical laws were standard fare in promotional matter and in the thriving insurance press. Typical of the tone, the first issue of the *Life Assurance Chronicle* in 1846 directed its readers to the 'extensive fund of very valuable information' to be found in the *Annual Report of the Registrar General of Births, Deaths and Marriages in England* and to the material as well as the intellectual advantages to be had from studying the laws uncovered

by this ‘higher branch of knowledge’. This knowledge, insurance press and publicity repeatedly claimed, effectively underwrote the life assurance business.

> Life assurance as a system is based on the fact that human life, proverbially the most uncertain of all things, yet follows, in the aggregate, a fixed law … while we cannot tell how long any one man may live, we are enabled, by the study of mortality, to predict with singular exactness how many men out of any large body will die in each year until all the lives are extinct. (Scottish Amicable, prospectus 1876, MS 18262, GH)

Such reflections were not that far removed from those of Mrs Gamp at the head of this section. As both midwife and layer-out of the dead, attendant at the extreme poles of life, Mrs Gamp has some claim to expertise. That she has nothing more insightful to say is a mark of Dickens’ impatience with the inflated claims insurance companies routinely made about their grounding in statistical laws. What Dickens in his relentless parody of the Anglo-Bengalee grasped, was the Olympian leap between the claims of law-like regularities uncovered by statistics and probabilistic reasoning, and the claims to safety on the basis of such regularities. By the first decades of the nineteenth century there *was* a relationship between insurance company practice and statistical knowledge. Companies *did* use mortality statistics to price their premiums and they *did* use probabilistic and actuarial calculations to forecast their liabilities. But statistics did not, perhaps could not, offer the kind of financial guarantees that company publicity implicitly promised. Companies wilfully overstated the certainties promised by statistics and probabilistic reasoning and glossed over the real and salient distinction between the populations they insured and the population from which the mortality tables they used were drawn.

In doing so companies were merely demonstrating the sort of appetite for statistical laws that Hacking (1990) describes in the proceedings of the 1825 Select Committee to Consider the Laws Respecting the Friendly Societies. Here the need for a more accurate means of

pricing Friendly Societies' premiums translated into a determination to define the laws governing sickness rates; a determination which persisted despite a lack of reasonable evidence to support it as part of a growing conviction that fixed rates of sickness, like mortality, did indeed exist. This conviction was not matched by a scientific consensus. His investigation into sickness rates under the auspices of the Committee led John Finlaison, the chief actuary at the National Debt Office, to conclude that he was not only unconvinced by the data evidencing fixed rates of sickness but by a law of mortality itself.

Irrespective of whether fixed laws of mortality exist, insurance company practice in regard to such laws at the time smacked more of hope and promise than of mathematical certainty. For one thing, insurance companies relied primarily on Price's eighteenth century Northampton tables which overestimated mortality, placing life expectancy at birth, someway south of the Biblical estimate, at 24. But even *if* insurance companies had drawn upon more accurate tables this would not have altered the fact that the local population that any company agreed to insure was not equivalent to any general population from which mortality tables could have been drawn. As the newly formed Institute of Actuaries had it in 1852, a 'fixed' rate of mortality and a 'fixed' rate of sickness were 'evidently untenable' notions, such rates would most likely differ in every insurance association 'not widely perhaps but characteristically' (Cited in Porter, 1996, p38).

For this reason, companies needed good rules to inform selection of which lives merited insurance and expert professional management at least as much as they needed mortality statistics. Sound insurance company practice, according to nineteenth century actuaries' testimony, was about selection and judgement not mathematical certainty. Yet it is mathematical certainty with which twentieth century actuaries have been most readily associated. It was also insurance, until quite recently, that stood as the market exemplar of the accuracy of statistical and probabilistic reasoning. It may be still too soon to tell whether

upheavals, such as the collapse of the Equitable, with its now ironic but historically well-deserved reputation for excessive caution, and the seismic failures of mathematical calculation underlying recent financial crises, will produce any lasting disturbance in the expansion of what Gigerenzer et al. in 1989 called the 'empire of chance'. These failures may be hard to ignore but the faith that chance could be tamed by probabilistic reasoning has already long prevailed over available evidence that mathematical calculation has its limits. Nineteenth century actuaries may have defended their professional standing as independent experts making reasoned judgements as well as technical calculations but the commercially convenient 'myth of actuarial perfection' has long over-shadowed this description of the work (Glenn, 2000).

This peculiar situation is typical of the ambiguities and tensions in the relationship between technical method and commercial practice. The fit between them is good, the former clearly informs the latter, but a good fit is not a perfect one. In the matter of technique, context, approximations and judgements, remain significant. Gigerenzer et al. offer a neat example.

> Life insurance is the oldest form of mathematically based insurance and the one best fortified with data and techniques. But even that warhorse of the trade, the mortality table, cannot be constructed from the data without a modicum of judgement and a good eye. Graphing the mortality figures yields an irregular scatter of points, not a smooth curve, from which the actuary extracts a mortality curve by 'graduation techniques' – ie by drawing a curve freehand through the cloud of points. This is a tricky business, for the curve must strike a balance between the regularity expected and the 'indications' that new trends have emerged, and the only qualification for making such nice distinctions is long experience in the business. (1989, p256)

As clearly as the role of judgement can be traced, the myth of actuarial perfection is not to be corrected simply by augmenting the objective work of probabilistic and statistical calculation with subjective judgement. A better understanding of the relationship between

insurance, probability and statistics involves acknowledging not just the ground separating subjective and objective methods, but also the ground they share. Insurance, in combining chance, love and logic, hints at the deep connections between the history of probability and that of metaphysics. The standing of probabilistic, mathematical and statistical reasoning as objective is a notable accomplishment not just because it took decades of rhetoric and rearrangements to achieve, but because the preoccupations of early probabilists were themselves metaphysical. Until well into the nineteenth century, the absence of disciplinary boundaries between the natural and social sciences meant there was little to prevent thinkers like Charles Sander Peirce and Gabriel Tarde from straying from mathematics to biology to sociology, linguistics, philosophy and back. But for eighteenth century classical probabilists, matters were even more mixed in an approach that combined a subjective, theological faith in intelligent design, order and harmony with a fluid sense of probability that permitted objective frequencies.

Classical probability theory sprang directly from the beliefs and conduct of reasonable men – it did not presuppose a prior, independent mathematical theory. For Laplace, probability was 'only good sense reduced to a calculus' (in Gigerenzer, 1989, p13) and modelling good sense was a serious mathematical preoccupation. This determination to model reasonableness of course ran up against the fact that reasonableness varies contextually even among the select, enlightened '*hommes éclairés'* –reasonableness in judges is distinct from that in merchants – but it also ran up against the conflicting demands of describing versus prescribing reasonable conduct. By the beginning of the nineteenth century, the French Revolution had shaken any faith in a single, shared standard of reasonableness and reason began to be identified instead with 'unanalyzable intuitions and sensibility' (Gigerenzer, 1989, p35). The bonds linking the subjective and objective within classical probability also came apart in this shift, and in the 'avalanche of numbers' (Hacking, 1990) flowing from

government offices across Europe, conditions were ripe for a hard distinction between 'subjective judgement' and 'objective calculation' and a model shift from the reasonable man to the average man.

Un Homme Moyen?: statistics and anti-statistics

> *Brussels, 21 February 1844* Another question of the highest importance presents itself here. One may ask if there exists, in a people, *un homme type*, a man who represents this people by height, and in relation to which all other men of the same nation must be considered as offering deviations that are more or less large. The numbers that one would have, on measuring the latter, would be grouped around the mean, in the same way as the numbers one would obtain, if the same typical man had been measured a large number of times by more or less imprecise methods. (Quetelet, in Hacking, 1990, p105)

Until this point, if life assurance was informed by probability theory, it was in the classical mould favoured by De Morgan, one of the last adherents to a definition of probability as the 'feeling of the mind, not the inherent property of a set of circumstances' (1838, p7). By mid century this approach was increasingly, and epithetically, termed 'subjective' in contrast to the 'frequentist', 'objective' view by then in the ascendant (cf Gigerenzer, 1989). Again, though, the subjective tag is misleading. For De Morgan probability was not a question of personal belief but it arose in the 'logical relation between evidence and reasonable degrees of belief' (Hacking, 1990, p127). While probabilists over the last 150 years or so may have veered more to one side, the objective, than the other, most accept that probability remains 'Janus-faced' with both objective and subjective sides in an irreducible relation between relative frequencies and degrees of belief (Gigerenzer, 1989, p274).

Irreducibly related or not, the tide had turned away from attempting to marry these two dimensions by the time John Venn nailed the fundamental conception of probability in 1866

in frequentist terms as concerning a series 'which combines individual irregularity with aggregate regularity' (Hacking, 1990, p126). This shift in probability theory was informed and fed by the nineteenth century appetite for statistics. Legislators and companies alike were *interested* in statistics because statistics had already begun to achieve standing as a form of evidence so compellingly objective as to be almost incontrovertible. In contrast to probability theory, there was little ambiguity in the statistical commitment to objectivity, as the London Statistical Society put it, 'the first and most essential rule' was 'to exclude all opinions' (in Gigerenzer et al. 1989, p 38). By adopting a statistical approach, individual intuitions and sensibilities could be set aside as irrelevant distractions in favour of an investigation of the hidden causes behind patterns discernible in large numbers. This looked like the means to a social science which could 'see' and analyse individuals through society.

It was this project that drove Adolphe Quetelet in his effort to make *'l'homme moyen'* not *l'homme eclaire* the centre of analysis. Quetelet, an astronomer by training, saw in human behaviour the same sort of regularities he observed in heavenly bodies and it was human, social laws he was after. 'Man', Quetelet pronounced, 'is born, grows up, and dies, according to certain laws that have never been studied" (in Menand, 2002, p187). Quetelet's mission was to identify how these laws translated into the mechanical rules of rational belief and action manifest in the conduct of the 'average man'. By mapping characteristics like height, weight, education, mortality, suicide etc. Quetelet aimed to use statistics to define probabilistic 'penchants' for certain acts. The average man, was not a 'human' but a 'national' average and therein lay the basis of the idea that races could be objectively measured by the physical and moral qualities of their average type. As I aim to make clear below, nothing of the fictive basis, the unsavouriness, or the implausibility of the 'average man' has stood in the way of its enduring utility in all sorts of arguments.

This utility stems from Quetelet's inspired replacement of the idea that precision required a single absolute value with a new technique for quantifying errors. Through this technique, the bell-shaped curve generated by the law of errors, was to be applied to social phenomena. In order to grasp just how peculiar his statistical objectification of the average man is, it is worth exploring how Quetelet got there more closely. One route to the bell-shaped curve comes from the binomial distribution resulting, for example, from coin-tossing, another results from astronomical observations, for example when errors in the measurement of a celestial position arise from the discrepancies between a real point in space and errors made in measurement. In applying the same curve to populations of men, what Quetelet did was to convert a *fictive* human mean into a *real* quantity (Hacking, 1990). One of the routes he took to this point was a study of the chest measurements of around 5000 Scottish regimental soldiers. Through these measurements he concluded that the distribution from measuring 5738 chests is analogous to the distribution resulting from one tailor measuring the same chest 5738 times; 'we should be much embarrassed to state which series was taken from 5738 different soldiers, and which was obtained from one individual with less skill and ruder means of appreciation' (Quetelet in Hacking, 1990, p110).

Quetelet's conclusions, as Hacking points out, don't make a great deal of sense but that did not prevent them fuelling an enthusiasm for plotting every sort of human, animal, vegetable, physical and finally moral attribute as if according to the law of errors. For C.S. Peirce (1998, p64) Quetelet's success in applying the law of errors to biological and social matters is an illustration of the 'great utility which fictions sometimes have in science'. By 1878 when Peirce's '*The Doctrine of Chances*', was first published, he was already complaining of the frequent use of 'the average man' as a term designed to produce the 'appearance of exactitude where none exists' (1998, p64). With Darwin clearly in mind, Peirce praised the way naturalists employed the idea of continuity to mark 'the passage from

one form to another by insensible degrees' (1998; p63). The trouble was the idea of continuity was so appealing it was being stretched to fit situations that have no continuity, such as, the average number of residents in a New York house.

Peirce was marking just the beginnings of the trend towards social averaging which was to expand by the early twentieth century to a point which would surely have tested his famously volatile temper. The peculiarity of the idea that actual chests would vary in a pattern analogous to a tailor's errors in measuring one chest, should not distract from the profound influence of social averaging techniques. The blurring in everyday usage of clear distinctions between terms like 'average', 'mean', 'typical' and 'most' went alongside a methodological mania for describing all manner of social phenomena in quantitative terms. This mania was one in which 'statistical majorities, bell curves and impersonal data points came to structure America's social imagination' (Igo, 2007, p6). Statistical methods, Igo argues, helped 'make' a mass public but this was, in many respects, a continuance, not a divergence, from the foundational aims of statistics as a science designed to know the state and developed as a science of society.

In relation to life assurance, Quetelet's influence spread popular acceptance of the idea that laws determining all manner of individual human behaviour could be found. Quetelet's index, now known as the Body Mass Index (BMI), provided an actionable means of human averaging. While within the industry, as French and Kneale (2009) explain, the use of BMI indicators to price premiums is relatively recent, the use of BMI technology to calculate and stabilise categories like 'ideal weight', 'underweight', and 'obesity' is long established. It makes perfect sense for an industry based on the pricing of mortality risks to be interested in a means of quantifying height/weight ratios against health risks but the BMI also offers a neat example of the challenge human statistical averaging poses. BMI data is not derived from the world population but from a sample and one skewed to a particular demographic context. The

BMI in the main is 'derived from data obtained on Anglo-Saxon populations, [and thus] the generalizability and applicability of the BMI and its cut-off points to other populations has been questioned' (Eknoyan in French and Kneale, 2009, p1045). BMI data is shaped by its context which means that the average generated reflects the biases of its own sample. Also, by definition, exceptions fare badly in quantitative averaging systems. In this case, healthy, muscular bodies can emerge with BMIs coded as obese when a qualitative appraisal would settle, without hesitation, in the other direction.

This begins to suggest some of the difficulties posed by statistical objectivity. The diversity of biological and social phenomena just doesn't lend itself, very completely, to statistical coding. Something is often left out or left over until explained by intuition, feeling or judgement. At an everyday level, this involves something akin to an intuitive smoothing or translation of statistical findings. Thus of course everyone knows that families don't actually have 1.64 children, or in Peirce's anachronistic example 14.72 persons living in the average New York house, or that rugby players aren't really fat; its just that objective measurement has to *generalise somewhat*. But what precisely this 'generalising somewhat' actually leaves out can be difficult to spot in the enthusiasm for objectivity. The mundane smoothings over of statistics paradoxically also indicates the persistence, despite the triumphs of statistical forms of argument, of calculating *without* numbers.

This innumerate calculating persists through the history of life assurance. Despite their promise as impeccably objective evidence, the promotional use of mortality tables did not produce the growth, or the mass expansion of markets, that a rather different form of averaging, one that had little to do with statistics, was to. An interesting way of thinking about some of the reasons why this might have been the case is offered by Gabriel Tarde's reflections on statistics. Statistics play a central role in Tarde's sociology, having been at one stage appointed Director of Criminal Statistics at the French Ministry of Justice, he had a

practitioner's zeal in regard to the necessity of statistics. This zeal did not extend however to a commitment to the triumph of objectivity. In the re-enactment of his debate with Durkheim, Tarde remarks that if 'one depends on statistics as an essentially 'objective' source of information one is deluding oneself. The oracles of this sibyl are often ambiguous and in need of interpretation' (in Candea [ed.], 2010, p34). Part of Tarde's point was that statistics' potential was not then sufficiently developed to afford the definition of social facts that Durkheim had in mind. But Tarde also had an altogether more idiosyncratic, delicate and ambitious vision of statistical quantification than would be afforded by continuing development along the same lines. This was a vision which sought to resituate the intuitive and the metaphysical within statistics. The strength of a fully evolved statistics for Tarde would lie not in the purification *from*, but in the synthesis *of*, sensibilities. Only through such synthesis and through recognition of the symbolic character of the objective 'facts' of statistics could statistics be perfected as one of society's 'senses' (Tarde, 1903; Didier, 2010). A more dynamic method, alert to processes and variations in individual patterns of belief and desire, was required to fully explain, smooth or translate what the figures of ordinary statistics really meant (Tarde, 1903; Barry, 2010).

This is promising because Tarde's take on statistics also informed his account of the role of sensibilities, passions and imitation in economic life. Society, for Tarde, is imitation and this places possession and acquisition at the centre of his inherently economic schema. Tarde recognised without opposition the quantifying, mathematizing tendency in economic science. The problem was not mathematizing *per se* but the restriction of economic quantification to mathematical calculation. As Latour explains;

> A judgement of taste, an inflexion in the way we speak, a slight mutation in our habits, a preference between two goods, a decision taken on the spur of the moment, an idea flashing in the brain, the conclusion of a long series of inconclusive syllogisms, and so forth – what appears

> most qualitative is actually where the greatest numbers of calculations are being made among "desires" and "beliefs". (2010, p154)

While Tarde's account may veer to the counter-intuitive, he nevertheless cogently documents some of the ground that is left out in clinging to statistics as an accurate measure of objective social facts. Gigerenzer et al. argue that in the end 'probability served as a kind of protective belt for the hard core deterministic scientific program' (1990, p283) providing subsidiary standards which helped underwrite the claims of less than perfect knowledge. In certain ways, nineteenth century statistics can also to be said to have acted as a protective belt for a social scientific program offering a way of making the existence of social facts credible. This protective belt has been productive but the eager reliance on certain forms of statistics has not been unproblematic. In the hard insistence on the objectivity of statistics, the 'social facts' revealed were sometimes stripped so bear of context as to be almost meaningless and sometimes treated as if a penchant for murder say, was the same sort of thing and could be analysed in the same sort of way, as the position of a star.

In the next section I suggest that the life assurance industry found peculiar means to fill the gaps left by the excessive enthusiasm for statistics. If purified statistical averages in mortality tables did not quite hit the mark as what Tarde would call the 'imitative rays' necessary to prompt desire for life assurance, other means were found which did. In particular, insurance agents cast as good, average men acted to translate some idea of statistical averaging into a form that could prompt mass consumer imitation.

Industrial agents and the cultivation of averageness

As noted above, the life assurance industry had grown but not quite taken off by the middle of the nineteenth century. This was not for want of trying. De Morgan drew a derogatory parallel in 1838 between the 'magnificent style' of insurance prospectuses and the

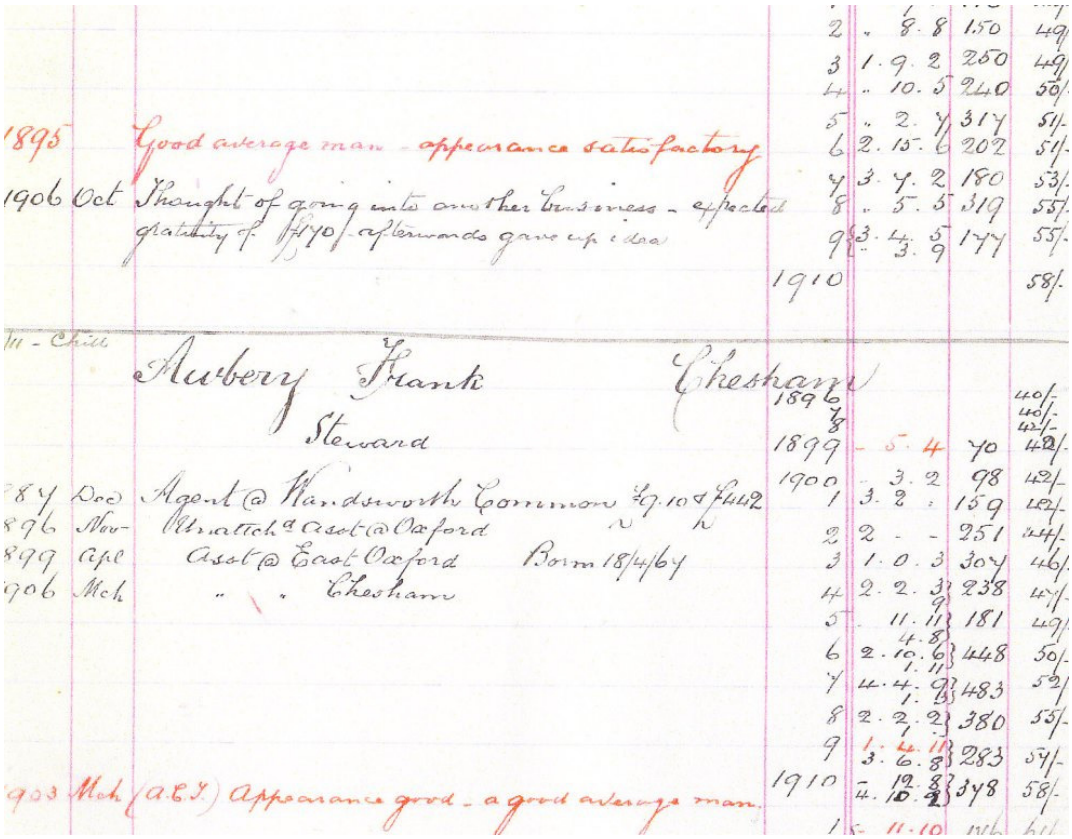
insistent advertising puffs of blacking manufacturers bemoaning that even the 'most eligible' of insurance offices resorted to puffing (1838, pp10-11). Insurance companies were prolific, inventive marketers adept at mixed, experimental forms of marketing combining advertising, publicity and public relations machinery with networks of part-time, commissioned agents. The latter met with mixed fortunes; agents were both integral to the early development of the industry and the source of continual frustration to companies exasperated by the 'steady rhythms of failure' (McFall, 2009). While early agents notched up some successes, their accomplishments were to be dwarfed by those of agents working for a new breed of company.

These new 'industrial' assurance companies drew inspiration from life offices, burial clubs and friendly societies in their efforts to target a gap in insurance provision for those members of the 'industrious' middle and working classes who survived by their own efforts. This was the preserve of companies like the Prudential, the Refuge and the Pearl, all set up between 1848 and 1864, using a system of agents not only to sell policies but to collect weekly premiums. In contrast to the slow trajectories of older life offices, the growth of industrial companies was spectacular. Thirty million policies were in force by 1910 (Morrah, 1955) a figure which had risen to at least 67 million by 1940 (HMSO). It wasn't simply that industrial companies caught a wave of expansion; their progress was no less impressive in relation to the rest of the market. Based on its 'ordinary branch'[1] premium income alone the Prudential went from nowhere in 1871 to become the largest British life insurer by premium income in 1890, holding the position in 1910 when, with 16.6 per cent of the market, it was almost four times the size of its nearest rival (Alborn, 2009). This flourishing of industrial assurance was in part a consequence of just how well agents were able to translate a quantitative, statistical product into a form that would engage passionate interests.

The term 'good, average man' is taken from a Prudential Assurance District Superintendent's Agent Record Book (PRU) where it featured frequently alongside variations

like ‘a good and I think, improved, man’ and ‘appearance satisfactory – a good man’ inked in red below the accounts derived from the agent’s ‘debit’ (Figure 2). The Record Book is a relic of a close supervisory system in which attitude, mood and appearance would be monitored and recorded alongside debit takings and new business written. Superintendents recorded a range of other remarks about agents – ‘depressed’, ‘scruffy’ ‘inclined to grumble’, ‘does not agree with wife’ even ‘seen smoking in the window without a coat on’ – which make it clear that agents judged ‘good, average’ were doing quite well.

Figure 2 Prudential Agents Record Book 1910-11 (PRU)



What is less clear is just how significant ‘good, averageness’ was to become to industrial assurance marketing. The average agent was already by 1910 becoming the central device in enrolling customers but the cultivation of averageness as a marketing quality was only beginning. Moreover, if the idea of an average man could trace its lineage back to Quetelet, the agent was also performing and translating averageness from a statistical concept to a

commonsense idea. Agents stretched beyond marketing in a restricted sense to act as a market device that 'frame' the market (Callon, Muniesa & Millo, 2007; McFall 2009b). In performing a cultivated averageness, they also worked as an 'inscription device' (Latour, 1988) offering a visual corporeal display that helped translate some idea of a statistical average while at the same time summoning the sensibilities, beliefs and desires which motivate the purchase of insurance. Through this combination, agents helped transform the promise of insurance into a form calculable, not just by 'any competent judge', but by any prospective consumer. Consumers were enrolled into industrial assurance; it became, in many communities, a socially necessary thing to do and it inspired long-term, even inter-generational, loyalty in ways that are wholly at odds with the comparative return on investment that industrial, as against ordinary life policies, or alternative savings schemes, offered. This was possible because through their agents, companies happened across a way of engaging the feelings and sensibilities as well as the financial calculations of their customers. In the remainder of the article I explore how the cultivation of agent's averageness fed an imitative pattern of consumption.

Often deliberately recruited as local men, industrial agents generally knew their communities well. They were exhorted to use this knowledge, to get to 'know their books' by developing their sensitivity to the daily rhythms, routines and relations of their customers. Agents who knew their books, knew family relationships and through the round of births, deaths and marriages, could identify prospects for new policies. But agents were also schooled in a form of salesmanship intended to enable them to enter such intimate turf without causing offence. Even quite early in the history of industrial assurance this involved cultivating a good, unobtrusive averageness. The Prudential Agent's Record Book testifies to a preference for agents who were not too scruffy, too grumpy or too miserable but also who were not too flash, too ambitious or too clever. This preference is elaborated on in the agent's

handbooks and companions of the period which feature extensive advice on how agents should comport themselves in the various situations they might encounter.

Echoing the advice endlessly repeated in the insurance press, vade-mecums and companions of the nineteenth century, agents were encouraged to canvass as widely as possible at 'every street, every door' (Forrester, 1907). In practice, for industrial canvassers this meant a broad canvass in 'decent working-class or middle or better class neighbourhoods' with an explicit injunction against canvass in 'very poor class neighbourhoods' and a tacit understanding that there would be little point in canvassing the homes of the very rich (Forrester, 1907, pp 17-20). Open canvassing meant coaxing agents out of their local neighbourhoods to knock at doors in middle-class neighbourhoods. Such canvassing was important to industrial companies because it was necessary to build the lucrative 'ordinary branch' business based on higher value policies and remitted premiums. Middle-class business however was the acknowledged 'bogie of the average industrial agent'; too nervous to canvass such homes effectively (Forrester, 1907, p40). In poorer but 'decent' areas, agents equally had to manage their 'fit' and were warned against displaying any hint of social condescension.

The preferred solution to such social tensions turned upon the virtues of affecting a quiet unobtrusiveness and 'such confidence in himself that he will never be embarrassed' (Forrester, 1907, p15). Agents were exhorted to manage their selves; physically, emotionally, mentally and aesthetically. Depression and disappointment could be avoided by 'keeping up the tone of the physical system … in winter, partake only of warm and invigorating food … it pays to dress well and feed plainly but carefully' (Forrester, 1907, p15). By the 1930s the key Pitman handbook was offering more elaborate advice on how the agent could go about 'perfecting his personality' (Sharpe and Taylor, 1936, p3). Acknowledging that agents were

individuals with distinctive personalities, agents were advised to 'be just yourself' but an improved self.

> [The] best business procured and retained is personality business, because the client is irresistibly drawn by the magnetic influence of the salesmen's personality. The more perfect the development of the student's own personality, the greater is his influence and attractive power. (Sharpe and Taylor, 1936, p4)

The developed personality would be able to explain the technicalities of insurance and engender confidence that a policy tailor-made to suit the prospect's needs was being offered by a sound office. The route to such successful salesmanship lay in nourishing all aspects of the personality; the emotional, intellectual and especially the physical and volitional. Agents 'obviously' needed to be informed about insurance but less obviously they needed to deliver their messages in good voice; 'the lips should open and close freely and the teeth too should be well separated. Practice in front of a mirror, you should be able to insert one finger between your teeth for the broader vowel sounds' (Sharpe and Taylor, 1936, p17). Accents should not be completely hidden but 'obvious provincialisms' 'slang' or 'journalese' should be avoided.

These vocal refinements were designed to insure agents could pass 'without the slightest suspicion of familiarity with those in superior positions, or patronage of those whom you may think your inferiors' (p25). In matters of dress too, agents should cultivate quiet, good taste avoiding 'ill-chosen colours' that might cause 'the artistic sense of a female prospect to revolt' but equally avoiding any hint of effeminacy (p90). Careful attention should be paid to personal hygiene; teeth, breath and hands should be well kept. Equally important, agents should conquer fear, shyness and anxiety and cultivate the right mental attitude. This meant a calm middle-ground, never presenting a 'dejected attitude or miserable countenance' but

equally avoiding excessive humour, high-spirits or forced optimism. A 'genuinely cheerful disposition' would require 'cultivating so that it becomes a habit' (p80-81).

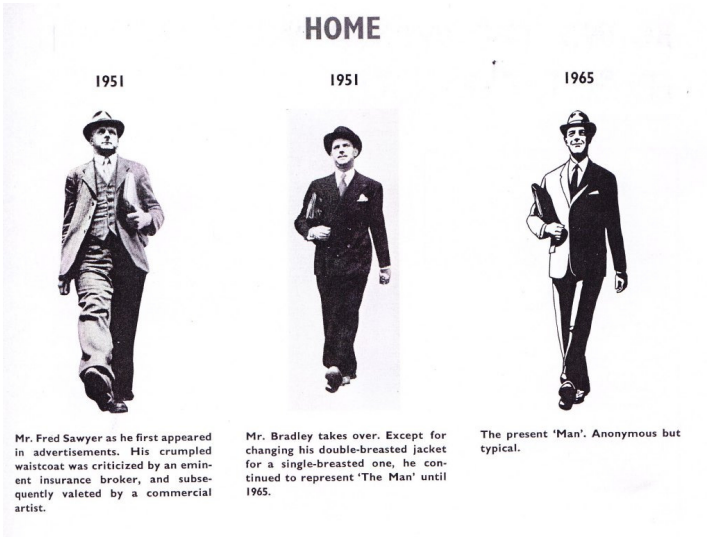
This salesmanship advice built up an idealised notion of the good, average agent and it simply echoed management and supervision practices also designed to foster these qualities. Agents' techniques were closely monitored, they were often accompanied by inspectors, who would both offer feedback on how performance could be enhanced and virtuoso displays of how new business could be sold. When a good prospect for larger ordinary branch (OB) policy was identified, a specialist OB agent would go along to help close the sale. This was part of a fraternal sales culture which also featured formal sales dinners, award schemes and sporting events all designed to foster the 'naturally cheerful' healthy and robust personality a 'good man' needed.

Significant as the cultivation of a good sales personality was, the role of agents in the industrial business was not just about sales. In important respects, industrial agents *were* the product. As Lloyd George and Beveridge complained, agents were viewed as policyholder's 'guides, philosophers and friends' and were a formidable force in sustaining the market. When faced with complaints about the poor rate of return offered by industrial policies, the industry's standard defence was that 'home service' was part of the product and that policyholders willingly paid extra for the service element (Nationalisation Box, PRU). In addition, the reassuringly average agent, as the twentieth century progressed, formed the core of many company's marketing, and for one company in particular, branding, strategies.

Figure 3 1936 Prudential Advertisement (PRU)

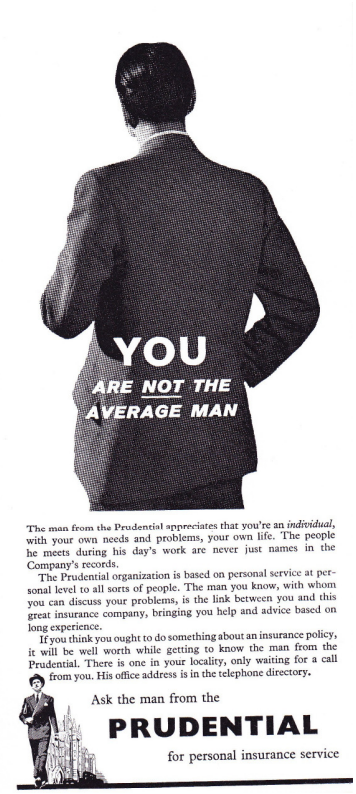
By the 1930s the agent, at the doorstep, at the garden fence or at the fireside was becoming an increasingly common theme in advertising and promotional materials. While 'injecting a little fear' was already a well-established advertising strategy and while insurance offers huge scope for playing on fears of death and accidents, many companies often preferred instead to feature agent's visits and reassuring, everyday, scenes. This tendency was taken further when the Prudential opted to turn the mildly pejorative phrase 'the man from the Pru' to its advantage. Following a *Weekly Illustrated* article on the work of industrial agents the Prudential's publicity department experimented with adopting the phrase as a slogan. The studied average 'Man from the Prudential' went on to become an iconic visual brand for more than twenty years. The first 'man' was drawn from a real life agent, Fred Sawyer. Sawyer was a bit too heavy and scruffy to last as the model of the good, average, (as critiqued by the then Chancellor, Stafford Cripps) and was soon redrawn from another model, Mr Bradley, who was further anonymised to better represent a typical agent in 1965.

Figure 4 Men from the Prudential, *Prudential Bulletin* 1965



As a visual brand the 'man' graced a wide range of advertising and marketing materials, sometimes centrally and sometimes as a corner logo. The 'man from the Prudential' was an ideal average, anonymous, respectable and safe even while reassuring customers that they, of course, were not average or anonymous to the company (See Figure 5).

Figure 5 Men from the Prudential, *Prudential Bulletin* 1965



As a market device that not only marketed but was part of the product, the good, average agent worked to enrol customers and render life insurance calculable. Twentieth century industrial life marketing eschewed the mortality statistics of nineteenth century insurance promotion to focus instead on a way of capitalising on the idea of averageness that struck a chord with consumers' emotional needs for safety, belonging and respectability. With anything up to 70 million policies in existence it is not difficult to imagine the role of industrial policies as a mark of social respectability in working-class communities that Johnson (1985) describes. Agents 'fitted' the needs of such communities and they fostered the imitative tendencies which made industrial insurance socially necessary. They were able to translate a statistical product and the statistical idea of averageness into a more palatable, and ultimately more calculable, form for consumers. None of this was pre-ordained, rather the story of industrial assurance is one in which the companies succeeded to the extent that they were able to react to the habits, desires and sensibilities of their customers. For a time, industrial agents were a good, reassuring average, by the end of the 1970s, commissioned market research identified them with seedy, backward looking harbingers of death, indelibly associated with the funerals on which their market was originally based (PRU).

Final comments

If this reads like a tortuous argument that statistics don't matter when it comes to customer choice something has gone badly awry. Statistics absolutely do matter. As inscription devices statistics worked - long before the ascendance of SPSS (Uprichard, Burrows and Byrne, 2008) - as an intrinsic element in how society or 'the social' was known, and in what was known about it. Nevertheless in insurance marketing, statistics did not matter in quite the way early insurance companies hoped they might - as incontrovertible evidence, persuasive because objective. By themselves, statistics were not a persuasive marketing argument because they

were not a calculable marketing argument - since the latter involves both more, and less, competence than statistical calculation.

There may still be few competent to judge an applied mathematical argument but that, as the fallout from the financial crisis of 2007 continues to show, has not stood in the way of the rapacious development of mathematically modelled financial instruments of bewildering complexity. This is possible because consumers of derivatives like Credit Default Swaps do not calculate solely mathematically any more than industrial life assurance customers did. For both sorts of transaction, numbers are in, but not all, of the calculation. If agents, as good, average men, were able to convey a hint of the statistical knowledges underpinning insurance products, it was a hint germane to calculation. It was a hint of science, of progress, of safety in numbers. In explaining premium tables informed by mortality statistics, agents could, when required, assist consumers in making statistical calculations but this alone is not what made industrial insurance calculable. Calculability, for consumers, demands more than mathematics, it demands an insertion of the device, of the product, into the habits and traffic of everyday life. In their cultivated average-ness, agents offered the means of insertion, the means of making insurance applicable to conduct.

[1] 'Ordinary' branch premiums were not collected but remitted periodically companies like the Prudential and the Pearl offered both types.

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